

AMENDMENTS TO THE CLAIMS

1-38. (Cancelled)

39. (New) An optical information recording apparatus comprising:
means for focusing a laser light to a laser spot to form a mark on an optical recording medium; and
means for modulating a size of said mark according to a level of a multi-level signal that corresponds to information to be recorded, and
wherein a strength of said laser light for recording each mark is modulated according to a waveform comprising a first rectangular erasing pulse signal, a rectangular recording pulse signal, an off-pulse signal and a second rectangular erasing pulse signal,
said laser light having a strength set to a value indicated by said first rectangular erasing pulse signal can erase a recorded mark,
said laser light having a strength set to a value indicated by said rectangular recording pulse signal can record a mark,
a strength of said laser light set to a value indicated by said off-pulse signal is less than a strength of said laser light used in reproduction of said recorded marks,
said laser light having a strength set to a value indicated by said second rectangular erasing pulse signal can erase said recorded mark, and
a product of the time interval of said rectangular recording pulse signal and a relative linear velocity between said laser spot and said medium is shorter than a length of said recorded mark, and
wherein a length of said rectangular recording pulse signal is set to a predetermined constant value and a length of said off-pulse signal is adjusted according to said multi-level signal.

40. (New) The apparatus of claim 39, wherein a size of said mark is modulated according to said information by means of modulating a pulse width of said off-pulse signal so that a time interval between a rising edge of said rectangular recording pulse signal and a rising edge of said rectangular erasing pulse signal corresponds to said size of said mark.

41. (New) The apparatus of claim 39, wherein said apparatus is arranged such that a center of said mark is placed at a center of a cell by means of adjusting both a rising edge of said rectangular recording pulse signal and a rising edge of said rectangular erasing pulse signal.

42. (New) The apparatus of claim 40, wherein said apparatus is arranged such that a center of said mark is placed at a center of said cell by means of adjusting both said rising edge of said rectangular recording pulse signal and said rising edge of said rectangular erasing pulse signal.

43. (New) The apparatus of claim 39, further comprising means for controlling timing of a falling edge of said rectangular recording pulse signal.

44. (New) The apparatus of claim 40, wherein said size of said mark is fine-adjusted by controlling timing of a falling edge of said rectangular recording pulse signal.

45. (New) The apparatus of claim 41, wherein said apparatus is arranged such that said size of said mark is fine-adjusted by controlling timing of a falling edge of said rectangular recording pulse signal.

46. (New) The apparatus of claim 42, wherein said size of said mark is fine-adjusted by controlling timing of a falling edge of said rectangular recording pulse signal.

47. (New) The apparatus of claim 39, further comprising means for controlling said strength of said laser light.

48. (New) The apparatus of claim 40, wherein said size of said mark is fine-adjusted by controlling said strength of said laser light.

49. (New) The apparatus of claim 41, wherein said apparatus is arranged such that the size of said mark is fine-adjusted by controlling said strength of said laser light.

50. (New) The apparatus of claim 42, wherein said size of said mark is fine-adjusted by controlling said strength of said laser light.

51. (New) The apparatus of claim 43, wherein said apparatus is arranged such timing of a rising edge of said rectangular recording pulse signal is controlled so that a center of said mark is placed at a center of a cell.

52. (New) An apparatus for recording information on a medium, said apparatus comprising:

a source of laser light; and

a modulator for modulating a size of a mark according to a level of a multi-level signal that corresponds to information to be recorded, and

wherein a strength of said laser light is modulated according to a waveform comprising a first rectangular erasing pulse signal, a rectangular recording pulse signal, an off-pulse signal and a second rectangular erasing pulse signal,

said laser light having a strength set to a value indicated by said first rectangular erasing pulse signal can erase a recorded mark,

said laser light having a strength set to a value indicated by said rectangular recording pulse signal can record a mark,

a strength of said laser light set to a value indicated by said off-pulse signal is less than a strength of said laser light used in reproduction of said recorded marks,

said laser light having a strength set to a value indicated by said second rectangular erasing pulse signal can erase said recorded mark, and

a product of the time interval of said rectangular recording pulse signal and a relative linear velocity between a laser spot and said medium is shorter than a length of said recorded mark.

53. (New) The apparatus of claim 52, wherein said apparatus is arranged such that a relation between the length (ML) of said mark along a track and a diameter (BD) of said laser spot satisfies $ML \leq BD$, and a product of the pulse width of said rectangular recording pulse signal and said relative linear velocity is less than 20% of said diameter (BD) of said laser spot.

54. (New) The apparatus of claim 52, wherein a relation between a length of a minimum mark (MLmin) along said track except when there is no mark and a diameter (BD) of said laser spot satisfies $ML_{min}/BD \geq 0.10$, and each level of said multi-level signal is assigned so that the level difference between adjacent levels becomes equidistant except when there is no mark.

55. (New) The apparatus of claim 52, wherein said apparatus is arranged such that a relation between a length of a maximum mark (MLmax) along said track, except for a mark that has about the same length as a diameter of said laser spot, and a diameter (BD) of said laser spot satisfies $MLmax/BD \leq 0.70$, and each occupied mark ratio of said multi-level signal is assigned so that the difference between said occupied mark ratios corresponding to adjacent levels of said multi-level signal becomes equidistant except for said mark that has about the same length as said diameter of said laser spot.